

Article

Bulbophyllum abangjoei sp. Nov. (Orchidaceae: Dendrobieae), a New Species of Orchid from Sarawak

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Abstract: *Bulbophyllum abangjoei* is a new one-flowered orchid species described from Lanjak Entimau Wildlife Sanctuary, Katibas and Anap-Muput, Tatau, Sarawak. The taxonomic treatment is accompanied by taxonomic notes, information on the species' affinities at infrageneric level, geographical distribution, habitat ecology, and implications for their conservation. It is morphologically almost similar to *Bulbophyllum deviantiae*, *B. membranifolium*, and *B. sanguineolentum*, but clearly differs in the long, narrowly oblong to linear leaf blade, subsessile petiole ca. 5 mm long, long narrowly cylindrical pseudobulbs with some mature pseudobulbs reaching $\frac{3}{4}$ length of the leaf blade, non-resupinate flowers, shortly upcurved and not emarginate labellum apex, and elliptic-oblong stelids at lower margins near the apex of the column. For these morphological differences, *B. abangjoei* is here described as distinct and new species to science. The new species is so far only known from three localities in protected areas in Sarawak, and hereby is assessed as 'Endangered' [EN B2 (a)(b) D1] under IUCN Red List criteria B and D.

Keywords: Bintulu; Borneo; *Bulbophyllum* sect. *Beccariana*; conservation priority; endangered; Kapit; riparian forest; taxonomy



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1. Introduction

Bulbophyllum Thours is probably the largest genus within Orchidaceae with more than 2000 species [1–4]. Borneo is probably one of the richest areas with about 300 species of *Bulbophyllum* and over 150 endemic species [4]. Vermeulen and O'Byrne reported 30 new species of *Bulbophyllum* found in Borneo Island [5]. In general, *Bulbophyllum* has sympodial rhizome either creeping or hanging loosely with distinct or inconspicuous pseudobulbs; new shoots and inflorescence are usually arisen from one of the nodes below the pseudobulb (never from the apex of pseudobulb), inflorescence maybe culminates one to many flowers, and the labellum is mobile as it is hinged to the column foot [1,2]. Most *Bulbophyllum* species are epiphytic, delicate, and drought-resistant. *Bulbophyllums* employ a 'drought escape' adaptive strategy by being deciduous, and shedding leaves and roots during dry conditions can minimise energy loss through transpiration [6,7]. Some species, such as *B. bakhuzenii*, *B. obtusum*, and *B. pileatum*, can survive and produce flowers or seed pods under harsh environments, including logged forest areas with opened canopies and extreme microclimate conditions [7]. Secondary forest and rubber plantations may harbour *Bulbophyllum* species, such as *B. vaginatum*, *B. macranthum*, and *B. patens*. Nevertheless, undisturbed or pristine habitats with high moisture and intermediate light exposure are particularly favoured such as on trees along the riparian forest area. About 14 years ago, in 2008, in the course of inventorying wild orchid diversity within the Lanjak Entimau Wildlife Sanctuary (LEWS), during a scientific expedition jointly organised by Academy of Science Malaysia (ASM) and the Forest Department of Sarawak, a new species of single-flowered *Bulbophyllum* was discovered and is described here after a few more the same specimens were collected from other locations.

2. Materials and Methods

Samples with floral structures were preserved using standard herbarium technique after Bridson and Forman [8] and voucher specimens were deposited in the Herbarium of Universiti Putra Malaysia (UPM) at the Department of Biology, Faculty of Science, UPM, Selangor, Malaysia, and Herbarium of Sarawak (SAR) at Research, Development, and Innovation Division (RDID), Forest Department Sarawak (FDS), Kuching, Sarawak, Malaysia. The robust non-flowering individuals were brought to the Anap-Muput Forest Management Unit (FMU) and transplanted into the ex situ conservatory as living collections. Herbarium specimens, orchid taxonomic monographs, and protologues on *Bulbophyllum* were referred to and studied for species identification. Plant materials which deposited K, SAB, SAR, and SING were examined through visits to the herbaria. Digitalised images of herbarium collections (AMES, AUU, BM, BO, K, MNHN, NHN-L, SING), botanical drawings, and records deposited in the Global Biodiversity Information Facility (GBIF) (<https://www.gbif.org/>), the National Herbarium of the Netherlands (NHN) accessed through Browse Dutch Natural History Collections: BioPortal (Naturalis) (<http://bioportal.naturalis.nl/>), Herbarium of Singapore Botanic Gardens (SING) accessed through BRAHMS Online managed by the University of Oxford (<http://herbaria.plants.ox.ac.uk/bol/sing>), the Swiss Orchid Foundation (<https://orchid.unibas.ch/index.php/en/>), the Kew Herbarium Catalogue (<http://apps.kew.org/herbcat/gotoSearchPage.do>), the Natural History Museum Specimen Collection (<https://data.nhm.ac.uk/>), the Herbarium of Aarhus University (AAU) (https://www.aubot.dk/search_form.php), Museum National D'Histoire Naturelle (MNHN) (<https://science.mnhn.fr/all/search>), and Plants of the World Online (POWO) (<http://www.plantsoftheworldonline.org/>) were examined prior to the taxonomic delimitation of the species complex, providing insights into morphological distinctness of the new species. Accepted names of the closely related taxa were validated via KEW World Checklist of Selected Plant Families (WCSP) [9] and Plants of the World Online (POWO) (<https://powo.science.kew.org/>).

3. Results

3.1. The Discovery

The first sight and collection of this species was during a scientific expedition to Ulu Ketibas, Lanjak Entimau Wildlife Sanctuary in 2008 [10]; subsequently, another population was discovered in Mulu National Park in 2016. In 2021, during an orchid rescue operation in Anap-Muput FMU active felling compartment (Figure 1), we discovered a few of the same plants among the rescued plants. When the plant flowered in February 2022, coupled with our detailed consultation and study of all online (K, NHN-L, AMES, BM, BO, AUU, MNHN) and physical (SING, SAR, UPM, SAB) herbarium resources for all major Bornean orchid flora, we were finally confident to describe it as a new species. The process to validate this beautiful gem took us almost 14 years and involved extreme and harsh fieldwork environments and numerous herbarium study visits. This included hundreds of hours of laborious strenuous fieldwork tracking and herbarium specimens' study. However, the long strenuous journey of this discovery is nothing when compared to the honour and joy of discovering new species to science and endemic to Sarawak, as this species is only found in Sarawak; hence, it is categorised as 'Endangered' according of IUCN Red List criteria and categories.



Figure 1. Discovery team (top left are the 2008 discovery team; others are the recent team).

3.2. Taxonomic Treatment

Latin diagnosis: —*Bulbophyllum abangjoei* affinis *B. membranifolii* subsp. *inuncti* (J.J.Sm.) J.J.Verm. et *B. membranifolii* Hook.f. subsp. *membranifolii* (sect. *Beccariana*) sed pseudobulbis cylindricis et longis, 4–10 × 0.3–0.5 cm. Folia linearia et longa, 18–20 × 1–1.5 cm. Flos non resupinatus. Sepala et petala alba vel pallide flava, striata septem roseo-purpurea. Labellum rubeum vel purpureum, reniformis, sparsum. Typus: MALAYSIA. Sarawak. Kapit, Song, Katibas, Lanjak Entimau Wildlife Sanctuary, Sg. Sekawi, 26 June 2006, ca. 100 m elev., R. Go, K.H.E. Khor, P. George, S. Sirukit, RG2081 (holotypus UPM!); Sarawak. Bintulu, Tatau, Anap-Muput FMU, Sg. Anap, 26 January 2021, ca. 100 m elev., R. Go, R. S. Punga, K. Kerman, A. Sufian, P. Leong, E. W. Usi, M. Azeman, H. Victoria A-R-0168 (paratypus SAR!) (Figure 2).

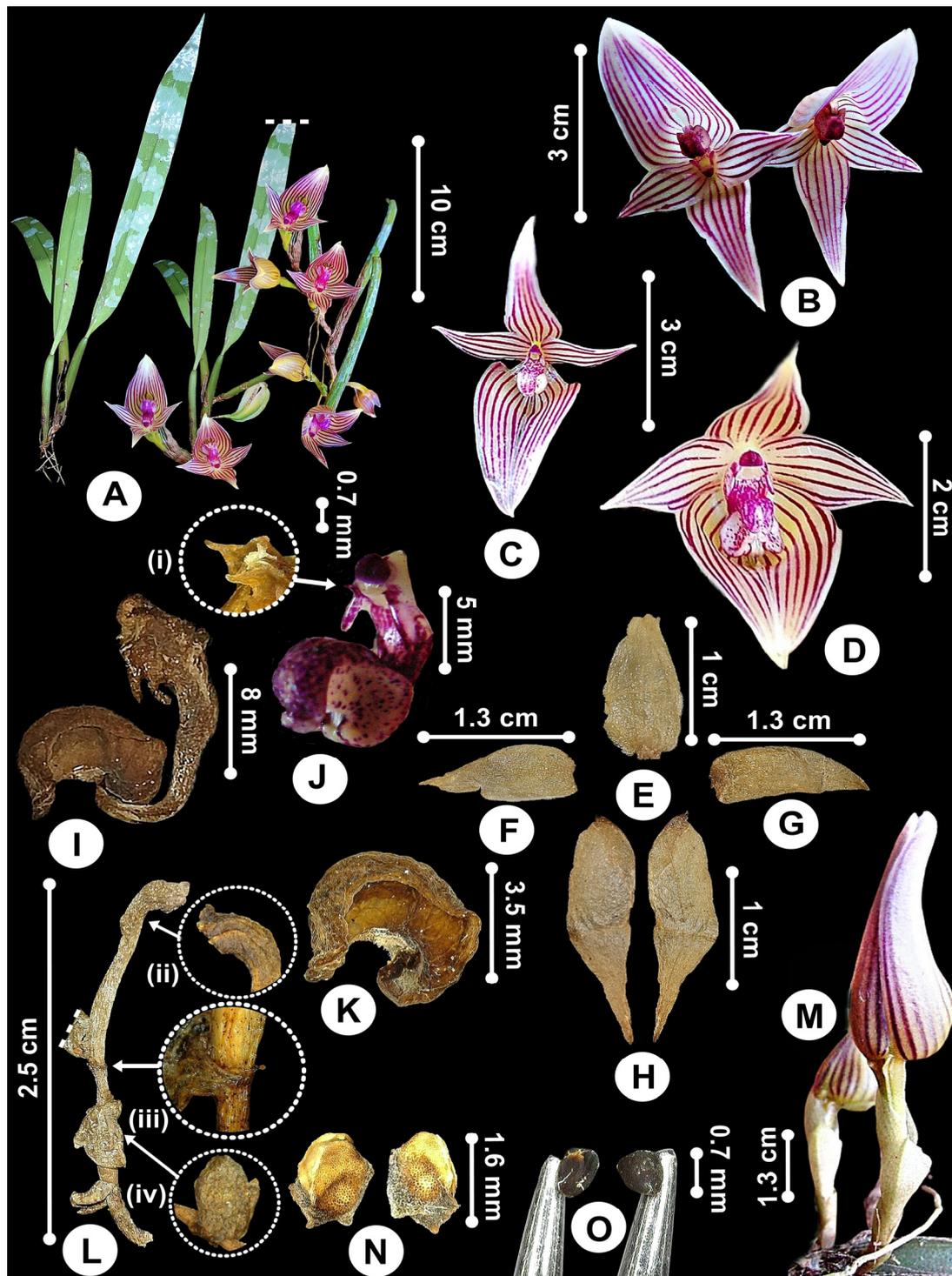


Figure 2. *Bulbophyllum abangjoei* sp. nov. (A) Plant; (B) non-resupinate and white flower of the holotype; (C) upturned flower of the holotype showing lateral sepals adherent at lower margins; (D) upturned flower of the paratype showing pale yellowish flower; (E) dorsal sepal; (F,G) petals; (H) lateral sepals; (I) column + labellum showing labellum base hinged on a thin ligament to the column foot; (J) column + labellum, showing upcurved apex of the labellum and acute (i) and elliptic-oblong margins of the stelidia; (K) lateral view of the labellum; (L) peduncle + pedicel + ovary, showing (ii) angular-crest ovary (ii), basal node pedicel coinciding with floral bract attachment (iii), and ovate bract (iv); (M) one-flowered inflorescence showing amplexicaul floral bracts; (N) anther-cap; (O) pollinia. E-H, I, K, L, N, O are spirit-preserved specimens.

Morphological description: —Plants epiphytic herbs. Roots mainly below the pseudobulbs. Rhizome creeping, 2–3 mm diameter, brownish; bract persistent, membranous, greenish brown, old bracts brown and fibrous. Pseudobulbs 5–10 mm apart, narrowly oblong to cylindrical, terete, long, mature ones $\frac{3}{4}$ length of the leaf blade, sometimes almost the same length as the leaf blade, 4–10 \times 0.3–0.5 cm, with shallow and inconspicuous furrows, basal covered by brown sheaths. Leaves sub-sessile, rather thin, narrowly oblong to narrowly linear blades, apex acute, 18–20 \times 1–1.5 cm, medium green; petiole ca. 5 mm long, terete and groove above. Inflorescence about 3 cm, one-flowered, emerging from rhizome at the base of the pseudobulb, sometimes two inflorescences emerging from a single node that may resemble a raceme, basal part with subtending bracts; peduncle 12 mm long; pedicel-with-ovary 10–12 mm long, basal node of pedicel approximate level with the floral bract attachment, ovary 3.6 \times 1.7 mm, with angular crests; floral bracts ovate, ca. 6 \times 4 mm, apex acute. Flowers non-resupinate, unscented, ca. 5.5 cm long from tip of dorsal sepal to tip of lateral sepals when open, wide opening, ca 2.5 cm wide, sepals and petals glabrous, 6–8-veined; pedicel-with-ovary about 10 mm long, ovary ribs with angular crests. Dorsal sepal rather thin, ovate, 1.5 \times 0.7 cm, apex acute, slightly upcurved at tip, margins entire to erose, glabrous, 7–8-veined. Lateral sepals free, 2.2 cm long, 0.6 cm wide at base, oblong-lanceolate, slightly falcate, longer than the median but firmly adherent along the lower margins, concave, margins entire to erose, 7–8-veined. Petals rather thin, with five pink linings, ovate, 13 \times 5 mm, apex acuminate, oblique, glabrous, margins entire to erose, 5–7-veined. Labellum resembles Alladin’s shoes, recurved towards base and towards tip, thick, ovate, 5–7 \times 2–3 mm, adaxially with a median furrow running from the base to apex, margin erose; apex obtuse, swollen, shortly upcurved ca. 1 mm forming a short transverse furrow at the abaxial side, margin erose, adaxial surface verrucose at the proximal margins bordering the median furrow; base hinged on a thin ligament to the column foot, with conspicuous, antrorse, rounded auricles at base, at about $\frac{1}{3}$ along the length of the labellum. Column including stelidia ca. 7–10 mm long; stelidia rounded with an apiculate apex, ca. 0.7 mm long, lower margin with a distinct, porrect, large, elliptic-oblong, obtuse ca. 1.6 mm long tooth; anther-cap ca. 1.6 \times 1.3 mm, cucullate, oblong-ovate, verrucate at lower margins; pollinia two (only two of four pollinia were seen in the spirit-preserved specimen), 0.7 \times 0.7 mm, oval. Seedpods green, spatulate with large, acutely angular ribs.

Colours: —Sepals and petals white to pale yellow with 5–8 pink-purple stripes from base to apex along the veins; labellum dark red or purple, pinkish purple with abaxial part whitish, finely spotted purple; column whitish flushed dark purple, anther cap dark purple.

Phenology: —Flowering in January–March and June.

Habitat and ecology: —Epiphyte on tree branches and trunks (Figure 3). Found growing in riverine and inland habitats with less exposed or partially shaded spots. Often rooting in mossy branches and trunks. The current known localities (riverine) are all flood prone vegetation and major river transportation routes, indicating the high possibility of anthropogenic and natural catastrophe to this species population.

Distribution: —Sarawak, Sg. Sekawi, Katibas, Song, Kapit; Sg. Anap, Tatau; Sg. Melinau, Mulu National Park. So far, these are the known locations of this new species endemic to Sarawak.

Etymology: —The species epithet, *abangjoei*, is after “Abang Joe” or Abang Zohari Abang Haji Openg, the current Honourable Premier of Sarawak. *Bulbophyllum abangjoei* Go, Besi and Pungga sp. nov. is truly synonymous to The Honourable Premier of Sarawak, Abang Joe in charisma. The flowers (sepals and petals) are white to cream colour with striking pinkish-purple stripes that signify his boldness and outstanding determination to safeguard the state biodiversity grandeur, boosting the exploration, conservation, and restoration of major landscapes in support of UN Decade on Ecosystem Restoration, that was aimed at preventing, halting, and reversing the degradation of ecosystems on every continent. The nature of the plant habit that is resilient against drought and occasional flood denotes Abang Joe’s resilience towards peer pressure, political upsurge, and global environmental mandate.



Figure 3. Plants in the wild and ex situ.

Proposed IUCN Red List Status: —*Bulbophyllum abangjoei* is an extremely rare taxon, known so far only in three localities in protected areas in Sarawak. Due to the very few numbers of known populations, the new species should be treated as ‘Endangered’ [EN B2 (a)(b) D1] under criteria B and D according to the guideline in the IUCN Red List Categories and Criteria version 14 (August 2019) [11].

4. Discussion

Taxonomic notes: —*Bulbophyllum abangjoei* sp. nov. is part of a small group of one-flowered *Bulbophyllum* species belonging to *Bulbophyllum* sect. *Sestochilus* (Breda) Benth. and Hook.f. (1883) and *Bulbophyllum* sect. *Beccariana* Pfitz. (1889), Group C and Group D *vide* [4], artificial key to the Asian sections of *Bulbophyllum* [12], that have a rather large solitary flower relative to the elliptic to linear leaf blades and ovoid to cylindrical pseudobulbs, such as *Bulbophyllum cornutum* (Blume) Rchb.f. *in* W.G. Walpers, *Bulbophyllum elevatopunctatum* J.J.Sm., *Bulbophyllum deviantiae* J.J.Verm. and P.O’Byrne, *Bulbophyllum ecornutum* (J.J.Sm.) J.J.Sm., subsp. *ecornutum*, *Bulbophyllum ecornutum* subsp. *verrucatum* J.J.Verm., *Bulbophyllum incisilabrum* J.J.Verm., *Bulbophyllum membranifolium* Hook.f. subsp. *membranifolium*, *Bulbophyllum membranifolium* subsp. *inunctum* (J.J.Sm.) J.J.Verm., *Bulbophyllum rugosum* Ridl., and *Bulbophyllum sanguineomaculatum* Ridl., which all were previously in sect. *Beccariana*. This new species is here categorised belonging to sect. *Beccariana*, Group D with one-flowered inflorescences, basal node of pedicel approximate level with floral bract attachment, margins of median sepal entire, floral bract not tubular but instead amplexicaul (basal part surrounding the stalk from which it arises) with the basal edges just connected at the base, sepals with 5–19 veins (7–8 veins on *B. abangjoei*), and median sepal free instead of connate to the lateral ones. Within sect. *Beccariana*, *B. abangjoei* is most closely related to *B. deviantiae*, *B. elevatopunctatum*, *B. membranifolium* subsp. *membranifolium*, *B. membranifolium* subsp. *inunctum*, *B. rugosum*, and *B. sanguineomaculatum*, which are almost similar in the flower’s patterns and colour variations. However, the new species is easily distinguished and distinct. The most significant diagnostic morphological characters of *B. abangjoei* are the long narrowly oblong-linear leaf blades ca. 1 cm width (instead of obovate or elliptic), long terete pseudobulbs in which mature plants have pseudobulbs almost as long as the leaves, non-resupinate flowers, and elliptic-oblong stelids at lower margins. Interestingly, amongst the 67 provisionally accepted species in *B. sect. Beccariana* (*vide* [4]), *B. abangjoei* is so far the only member of the infrageneric section with long narrow leaf blades (up to 10 cm long) and pseudobulbs. In addition, most of the species in the one-flowered sect. *Beccariana* exhibit resupinate flower. Apart from the long oblong-linear leaf blades with sessile petiole and long terete pseudobulbs, it clearly differs from *B. deviantiae*, *B. membranifolium*, *B. rugosum*, and *B. sanguineomaculatum*; a group which shares an almost similar flower colour variation by having apiculate stelids and shortly upcurved and swollen labellum apex (Table 1). It differs from *B. elevatopunctatum* by having flowers not scented, not spotted, with prominent pink-purple stripes from base to apex along the veins of the tepals, lateral sepals strongly adherent at lower margins instead of loosely adherent and reflexed at apices, as in most of the closely related species (Table 1).

Artificial key to one-flowered *Bulbophyllum* sect. *Beccariana* (Group D *vide* [4]) from Borneo, Peninsular Malaysia, and Sulawesi.

Pseudobulbs ovoid to cylindrical, 2–5 cm long; leaves ovate to elliptic with more than 1 cm width; flower resupinate *B. deviantiae*, *B. elevatopunctatum*, *B. membranifolium* subsp. *membranifolium*, *B. membranifolium* subsp. *inunctum*, *B. rugosum*, *B. sanguineomaculatum*
Pseudobulbs narrowly cylindrical to terete, up to 10 cm long; leaves linear with ca. 1 cm width; flower non-resupinate *B. abangjoei*

Table 1. Comparison of morphological characters of one-flowered *Bulbophyllum* sect. *Beccariana* ‘Group D fide [4]’ from Borneo and Sulawesi.

Characters	<i>B. abangjoei</i>	<i>B. deviantiae</i>	<i>B. elevatopunctatum</i>	<i>B. membranifolium</i> subsp. <i>membranifolium</i>	<i>B. membranifolium</i> subsp. <i>inunctum</i>	<i>B. rugosum</i>	<i>B. sanguineomaculatum</i>
Pseudobulbs	Narrowly cylindrical and terete, up to 10 cm long	Ovoid to cylindrical, 1–2.1 cm long	Ovoid, 2–5 cm long	Ovoid, 1.8–3 cm long	Ovoid, 1.8–3 cm long	Ovoid to cylindrical, 3–4 cm long	Ovoid to cylindrical, 2–5 cm long
Leaves blades	Thin, narrowly linear, ca. 1 cm wide	Thin, elliptic to ovate, up to 1.4 cm wide	Thick, elliptic, up to 3 cm wide	Thin, ovate to elliptic, up to 3.5 cm wide	Thin, ovate to elliptic, up to 6 cm wide	Thin, obovate to elliptic, up to 6 cm wide	Thin, obovate, up to 4 cm wide
Flower scent	Absent	Absent	Present	Present	Absent	Absent	Absent
Petals	Ovate, ca. 1.3 cm long	Ovate to oblong, ca. 1.8 cm long	Ovate to triangular, ca. 2.6 cm long	Elliptic to triangular, 3.0 cm long	Ovate to narrowly triangular, elongate up to 6.4 cm long	Ovate to triangular, ca. 2.5 cm long	Ovate, ca. 2.3 cm long
Labellum apex	Obtuse, swollen, shortly upcurved	Recurved at tip, coarsely verrucose, emarginate	Recurved at tip, papillose to coarsely verrucose, emarginate	Recurved at tip, coarsely rugose to verrucose towards the tip, ridges hirsute, emarginate	Recurved at tip, verrucose with minutely hirsute ridges, emarginate	Recurved at tip, glabrous or slightly rugose, emarginate	Recurved at tip, finely hirsute, verrucose or papillose, emarginate
Stelids	Apices apiculate, elliptic-oblong tooth along the lower margin	Apices rounded, recurved and strap-shaped oblique tooth along the lower margin	Apices subacute to acute, without teeth along the margins	Apices rounded to apiculate, narrowly oblong to narrowly elliptic tooth along the lower margin	Apices rounded to apiculate, narrowly oblong to narrowly elliptic tooth along the lower margin	Apices rounded to apiculate, with a rounded to obtuse tooth along the lower margin	Apices rounded to apiculate, narrowly triangular to oblong tooth along the lower margin

Notes: Morphological descriptions for *B. elevatopunctatum*, *B. membranifolium* subsp. *membranifolium*, *B. membranifolium* subsp. *inunctum*, *B. rugosum*, and *B. sanguineomaculatum* were retrieved from [4], and a description for *B. deviantiae* was retrieved from [13].

Species references:—*Bulbophyllum deviantiae* J.J.Verm. and P.O'Byrne, Gard. Bull. Singapore 60: 106 (2008) [9,10]; *Bulbophyllum elevatopunctatum* J.J.Sm., Bull. Jard. Bot. Buitenzorg, sér. 3, 2: 99 (1920) [11]; *Bulbophyllum maculosum* Ames, Orchidaceae 5: 180 (1915) (a synonym for *B. sanguineomaculatum*) [10]; *Bulbophyllum membranifolium* Hook.f. subsp. *membranifolium*, Fl. Brit. India 5: 756 (1890) [11]; *Bulbophyllum membranifolium* subsp. *inunctum* (J.J.Sm.) J.J.Verm., P.O'Byrne and A.Lamb, *Bulbophyllum Borneo*: 244 (2015) [11]; *Bulbophyllum sanguineomaculatum* Ridl., J. Linn. Soc., Bot. 32: 265 (1896) [11].

Additional specimens examined (closely related species):—*Bulbophyllum deviantiae*: INDONESIA. Sulawesi, South, *s.coll.* (holotypus SING-photo! barcode: 0108794); Sulawesi, Mangkutane-Pendolo Divide, Hort. Bot. Singapore SBGO 5057 (isotypus NHN-L-photo! barcode: L.0283978, L.0402190, L.0302295); Sulawesi, Mangkutane-Pendolo Divide, 27 May 2005, *s.coll.* (isotypus NHN-L-photo! barcode: L.1492771); *Bulbophyllum elevatopunctatum*: MALAYSIA. Sabah, 20 October 1931, J. Clemens and M. S. Clemens 26792 (AMES-photo! barcode: 02385268); Terengganu, Kenyir Lake, Gawi, 29 September 2019, E. E. Besi, D. Nikong, M. I. Mat Esa, M. C. Rajaram, and V. T. Justine TK019 (UPM!); THAILAND. Leiden Botanical Garden 20051280 (NHN-L-photo! barcode: L.1492724, L.2109089); *Bulbophyllum membranifolium*: MALAYSIA. Sabah, 15 July 1963, H. P. Fuchs 21040 (NHN-L-photo! barcode: L.1484629); Sabah, Interior Zone, along trail Long Pa Sia-Long Samado, 1 October 1986 to 31 October 1986, J. J. Vermeulen 611 (NHN-L-photo! barcode: L.2109201); Sabah, Interior Zone, S. Rurun headwaters, 1 December 1986, J. J. Vermeulen and H. Duistermaat 1099 (NHN-L-photo! barcode: L.2109199); Sabah, West Coast Zone, Kinabalu National Park, 1 December 1986, J. J. Vermeulen and H. Duistermaat 542 (NHN-L-photo! barcode: L.2109200); INDONESIA. Sumatra, 9 May 1920, H. A. B. Bunnemeijer 10174 (NHN-L-photo! barcode: U.1458442); Sumatra, Gunung Leuser Nature Reserve, Aceh, 21 June 1972, W. J. J. O. de Wilde and B. E. E. de Wilde-Duyffes 13159 (NHN-L-photo! barcode: L.2109195); Sumatra, Gunung Leuser Nature Reserve, Aceh, 2 April 1975, W. J. J. O. de Wilde and B. E. E. de Wilde-Duyffes 5981 (NHN-L-photo! barcode: L.2109194); Sumatra, Gunung Leuser Nature Reserve, Aceh, Mt. Ketambe, 2 August 1972, W. J. J. O. de Wilde and B. E. E. de Wilde-Duyffes 14216 (NHN-L-photo! barcode: L.2109189); East Kalimantan, 10 May 1993, A. A. Ambriansyah 742 (NHN-L-photo! barcode: L.2109204, L.2109205, L.2109206); PHILIPPINES. Luzon; Umiray, Province Tayabas, 1 May 1917 to 31 May 1917, M. Ramos and G. E. Edaño BS 29058 (NHN-L-photo! barcode: L.2109207); *Bulbophyllum membranifolium* subsp. *membranifolium*: MALAYSIA. Pahang, Cameron Highlands, 13 April 1930, M. R. Henderson 23555 (SING-photo! barcode: 0073516); Penang, Timur Laut, Western Hill, December 1886, C. Curtis *s.n.* (SING-photo! barcode: 0073481); Sarawak, Paku, Ulu Sg, Melinau, 26 June 1961, J. A. R. Anderson 4054 (SAR-photo!); Sabah, Head of Kina Taki River, 2 March 1933, J. Clemens and M. S. Clemens 31737 (MHN-photo! barcode: L.2109202); Sabah, Marei Parei spur, 23 March 1933, J. Clemens and M. S. Clemens 32311 (MHN-photo! barcode: L.2109203); Sabah, West Coast Division, Mt. Kinabalu, Marei Parei spur, 29 March 1933, J. Clemens and M. S. Clemens 34335 (AMES-photo! barcode: 02386951); Sabah, Mt. Kinabalu, Lumu-Lumu, 12 June 1933, C. E. Carr SFN27577 (AMES-photo! barcode: 02386948); Penang, Timur Laut, Tiger Hill, Barat Daya, cultivated in Orchid Enclosure 1, Botanic Gardens Singapore, 24 February 1967, H. W. Sipfhean 55 (SING-photo! barcode: 0130984); INDONESIA. Sumatra, Mt. Koerintji (Mt. Kerinci), 6 March 1920, H. A. B. Bunnemeijer 10174 (SING-photo! barcode: 0073497); Sumatra, Sumatera Utara, Gaju and Alas Lands, 19 February 1937, C. G. G. J. van Steenis 9027 (SING-photo! barcode: 0073499); *Bulbophyllum membranifolium* subsp. *inunctum*: MALAYSIA. Kedah, June 1893, H. N. Ridley 5127 (unknown type BM-photo! barcode: BM000062528); Kedah, Kedah Peak, July 1925, F. Flippance *s.n.* (SING-photo! barcode: 0073477); Penang, *s.coll.* (SING-photo! barcode: 0073478); Penang, Government Hill, 27 June 1918, Mhd Haniff 3779 (SING-photo! barcode: 0073480); Perak, Lower Camp Gunung Batu Putih, L. Jr. Wray 1123 (unknown type K-photo! barcode: K001368899); Kuching, Mount Matang, 11 September 1911, *s.coll.* 982096 (SAR-photo!); INDONESIA. cultivated in Hort. Bot. Bogor, January 1906, J. J. Smith *s.n.* (isotypus WU-photo! barcode: 0025121); NEW GUINEA. *s.coll.* (NHN-L-photo! barcode: L.2109209); *Bulbophyllum rugosum*: MALAYSIA.

Sabah, 1 September 1930 to 30 September 1930, *Amdjah* 1912/582 (NHN-L-photo! barcode: L.2109106); SINGAPORE. Chau Chu Kang, 19 August 1890, *J. S. Goodenough s.n.* (holotypus SING-photo! barcode: 0012219); PHILIPPINES. Leyte, Dagami, 10 July 1913, *C. A. Wenzel* 57 (AMES-photo! barcode: 00064955); INDONESIA. Sumatra, Mt. Kerinci, 1 May 1914, *H. C. Robinson and C. B. Kloss s.n.* (unknown type K-photo! barcode: K001368850); Sulawesi, Kampong Lombonang, *Hort. Bot. Singapore SBGO* 4820 (NHN-L-photo! barcode: L.1489078); Sulawesi, Lempe Village, *Hort. Bot. Singapore SBGO* 5802 (NHN-L-photo! barcode: L.1489079); ***Bulbophyllum sanguineomaculatum***: MALAYSIA. Selangor, Kuala Lumpur, 20 February 1890, *C. Curtis s.n.* (K-photo! barcode: K001368849); Terengganu, Kenyir Lake, Gawil, 01 April 2018, *E. E. Besi, D. Nikong, M. I. Mat Esa, M. C. Rajaram, and V. T. Justine EDW006* (UPM!); PHILIPPINES. Leyte, Dagami, 10 July 1913, *C. A. Wenzel* 199 (holotypus AMES-photo! barcode: 00064955); Leyte, Dagami, 21 June 1913, *C. A. Wenzel* 151 (AMES-photo! barcode: 00000527); Luzon, Quezon, 2 June 1917, *M. Ramos and G. E. Edaña s.n.* (AMES-photo! barcode: 02386215); ***Bulbophyllum* sp. (cf. *membranifolium*)**: Kapit, Song, Katibas, Lanjak Entimau Wildlife Sanctuary, fieldcamp Ng. Jela, 25 August 1998, *B. Gravendeel, C. G. Koops, S. Rebi* 982096 (SAR-photo!).

5. Conclusions

This new species currently found in small populations within three frequently visited forested areas and is named after a VVIP; hence, the in situ safety is at stake if no immediate protection and conservation plan is implemented. The immediate action to safeguard this species is keeping some plants as germplasm stock in an ex situ conservatory, propagate them artificially, and make them available in the market, thus reducing the extinction pressure in the wild. In addition, we hope that the **Proposed IUCN Red List Status** for *Bulbophyllum abangjoei* as ‘Endangered’ [EN B2 (a)(b) D1] under criteria B and D according to the guideline in IUCN Red List Categories and Criteria version 14 (August 2019) (IUCN Standards and Petitions Committee, 2019) be accepted and recognised instantaneously to ensure the species survival in the wild.

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